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Indian Standard

GUIDING PRINCIPLES FOR GRADING AND INSPECTION OF TIMBER

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
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Indian Standard

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Indian Standard

GUIDING PRINCIPLES FOR GRADING AND INSPECTION OF TIMBER

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 25 November 1971, after the draft finalized by the Timber Sectional Committee had been approved by the Civil Engineering Division Council.

0.2 At present there are several organizations in India, such as the Central and State Public Works Departments, Military Engineering Services, Railway and Defence Standards Organisations which prepare and follow their own specifications of timber in their respective limited circles. In addition, there are also several grading specifications brought forward by the Indian Standards Institution covering the use of timber of various species for various purposes. These standards are framed not only on all India basis covering widely different geographical regions in the country itself but also they require to be in general conformity with the ISO Recommendations on similar subjects. In view of such different organizations preparing specifications sometimes for the same type of materials, and since it will greatly facilitate inspections and arbitrations connected with grading of material traded between different zones, it is considered highly desirable to have uniform guiding principles for preparing such grading specifications of different products and species of wood. The present standard makes an attempt in this direction to ensure uniformity.

0.3 In the preparation of this standard considerable assistance has been rendered by the Forest Research Institute and Colleges, Dehra Dun who supplied valuable data.

0.4 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS:2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

*Rules for rounding off numerical values (*revised*).

1. SCOPE

1.1 This standard covers the general principles to be followed when preparing specifications on grading timber and timber products or actually grading such material in the field, and also covers rules for inspection and other matters related to such grading.

2. TERMINOLOGY

2.1 For the purpose of this standard, the following definitions and those given in IS : 707-1968* shall apply.

2.1.1 Commercial Grading — Also sometimes known as 'yard grading' or 'utility grading' refers to the principle by which the material is graded by consideration of usefulness of the material, and price factors.

2.1.2 Stress Grading — Often used synonymously with 'structural grading'. However, sometimes a small distinction is made between the two. Stress grading refers to the principle by which the material is graded by consideration of maximum principle stresses to which it can be subjected. 'Structural grading' refers to the principle by which the material is graded on the basis of visible defects which have known effects on the strength properties of the material.

2.1.3 Sub-grade — Grade of the material lower than the grade that is offered or certified.

2.1.4 Super-grade — Grade of the material higher than the grade that is offered or certified.

2.1.5 Tally — The sizes and number of individual pieces of a particular consignment.

2.1.6 Unit of Defect — See IS : 3364-1965†.

3. SYSTEMS OF GRADING

3.1 All grading specifications shall be clearly distinguished between:

- a) structural or stress grading, and
- b) commercial or utility grading.

3.1.1 Structural grading shall be further divided as follows:

- a) Grading based on known effects of defects and estimating accumulative value, and
- b) Machine grading.

*Glossary of terms applicable to timber and timber products (first revision).

†Method of measurement and evaluation of defects in timber.

3.1.2 Commercial grading shall be further divided in the following classes (*see also* Appendix A):

- a) Classification based purely on dimensions and general appearance,
- b) Classification based on the best ultimate use of the material,
- c) Classification based on qualitative evaluation of defects and rough estimate of out-turn of utilizable material, and
- d) Classification based on evaluation of 'units of defects' and fixing the permissible number for standard volume or area of the material in each grade.

4. ESSENTIAL REQUIREMENTS IN EACH SYSTEM

4.1 All grading specifications shall contain clear definitions and limitations of the grades or classes, both qualitatively and quantitatively, keeping in view their impact on price structure and current trade practices. Separate 'grade marks' may be indicated for separate grade names for marking on the material under transaction.

4.2 While preparing grading specifications, the normal supply and demand position and the availability of the material shall be kept in view to frame the clauses regulating the quality of the material.

4.3 All grading specifications shall clearly identify and evaluate factors which influence the quality and utilization of the material and they shall further clearly define methods of measurement of the dimensions of the material which have an influence on the quantity of the material.

4.4 All sampling clauses, evaluation of units of defects, etc, shall conform to practical tests.

4.5 Methods of measurement and evaluation of defects shall conform to IS : 3364-1965*.

4.6 All specifications shall also contain, in accordance with the principles enunciated under 5, relevant clauses for modes of inspection, storage, reinspection, etc.

4.7 All specifications shall also incorporate all necessary *pro formas* for keeping records of tally, inspection, certificates and other forms of agreement relating to grading.

4.8 All grading specifications shall clearly specify how consignments are to be presented, and sorted out for inspection and grading.

*Methods of measurement and evaluation of defects in timber.

5. INSPECTION AND REINSPECTION

5.0 All grading specifications shall provide relevant clauses for inspection in accordance with general principles contained in **5.1** to **5.9**.

5.1 While any standard provides for maximum permissible conditions of defects or defect values, it does not mean that a material having any one of these defects slightly in excess of permissible limits would completely disqualify the material for acceptance. It does not also mean that a material having all permissible defects for a grade would necessarily qualify it for that particular grade. The location and distribution of defects and their combination with other factors, are often important in the final acceptance and determination of the grade. The total absence of one defect may permit a lenient view of another defect.

5.2 Grading and inspection of material in lots and according to accepted sampling plans would generally be preferable to grading of individual.

5.3 On completion of any inspection, identical tally forms, and/or certificates shall be duly signed by the inspector and issued to all concerned parties. These documents form the basis for settling subsequent disputes, if any.

5.4 In case of any need for reinspection of a consignment on the basis of complaints on tally or grade or both, a latitude of 5 percent shall be allowed for personal judgement of the inspectors. The mode of reinspection shall be a matter of agreement between the purchaser and the seller. No complaints shall be entertained for further inspection after the first reinspection.

5.5 All deviations in factors leading personal discretion shall be clearly mentioned in the certificates of inspection. It may, however, be remembered that all grading rules are not the results of any accurate mathematical calculations but a collection of different aspects of a natural product brought on as close as possible to a technological pattern.

5.6 All rules in grading specifications shall be generally considered as guiding factors for balanced decisions of inspectors which may be further assessed by appropriate authorities, whenever so required.

5.7 The standard of inspection, whenever required to be assessed, shall be by an authority which will be specifically mentioned in the contractual agreements or otherwise mutually agreed to and shall be so assessed only by studying the documents of a particular inspector prepared on more than one consignment.

5.8 Unless otherwise stated, all inspection shall be for the grade under which the material is offered. Rejected material can be offered subsequently for a different grade.

5.9 If under any grading specification and inspection rules under which a consignment of timber has been graded and sold, be found to be 95 percent or more of said grade or better, the material below grade shall be accepted by the buyer as of the actual grade offered or so certified. When the sub-grades are found to be more than one grade lower than the grade offered or certified the sub-grades shall remain the property of the seller.

6. STANDARD FORMS AND PRO FORMAS

6.1 All grading specifications shall contain prescribed *pro formas* for grading, for tally, and for certificates of inspection.

6.2 In addition to the specific particulars required under each specification, the following general particulars shall be included in the concerned *pro formas* :

- a) Name of the inspection organization and by whom represented,
- b) Reference and specification of consignment(s) under which it is inspected and graded,
- c) Grade under which the consignment is offered and the description of the identification mark,
- d) Grade under which the consignment is placed and other remarks by the inspector, and
- e) Signature and seal of the inspecting authority.

6.3 A typical *pro forma* for grading of teak squares is given in Appendix B.

A P P E N D I X A

(Clause 3.1.2)

NOTE ON GRADING OF TIMBER

A-1. DETAILS OF GRADING

A-1.1 The different grade classifications of timber are given in **A-1.1.1** to **A-1.1.4**.

A-1.1.1 'A' Grade Classification — It is based purely, and sometimes arbitrarily, on dimensions and general appearance. The dimensions of lengths and girths for logs, or lengths, widths and thicknesses of converted

material, are measured according to specified methods. This system is prevalent in Kerala and Mysore. Under these classifications, teak is placed in four grades with two sub-classes in each grade. In the case of other hardwoods, there are similarly four grades in Mysore (Coorg) but the dimensions are fixed separately for each of the species. In Kerala, there seem to be only two grades of hardwoods.

A-1.1.2 'B' Grade Classification — It is based on the best ultimate use of logs or converted material. Such a system is mostly prevalent in Andhra Pradesh and some parts of Tamil Nadu, and seems to be one of the quickest systems of grading and marking. The logs are classified into grades on the best use possible as for beams, planks, scantlings, etc, and each grade is further divided into 'A', 'B' and 'C' classes to indicate occurrence of defects. Only two lengths are recognised; 'long' (that is, 5 m and above) and 'short' (that is, under 5 m). Each log is thus quickly stamped with the first letter of the grade classification, the sub-class, and 'L' or 'S' for 'long' and 'short', for example, BAL and PBS indicate, respectively, 'beam, A-class, long' and 'planks, B-class, short'. Sometimes another letter is also added to indicate the species, for example, 'T' for teak. For guidance as to the best use, indications of dimensional requirements (for example, girth for logs) are given in the specifications.

A-1.1.3 'C' Grade Classification — It is based purely on defects and estimates of out-turn. Under this, there are four classes of teak in some area of Madhya Pradesh and only two classes in other areas of the same state.

A-1.1.4 'D' Grade Classification — It is based purely on evaluation of 'units of defects' and fixing the number of units permissible for a standard volume in each grade. Such practices are common in the Bombay region; sometimes an estimated out-turn is also indicated in each grade. In general three grades are distinguished for various categories of logs and sawn timber. Sizes and other dimensions are also fixed in a few cases, separately for different species and different depots in the same state. This system is being increasingly adopted in the specifications of Indian Standards Institution, and in international grading specifications. This system has a distinct advantage of evaluating cumulative effect of defects in a particular grade.

A-1.2 Besides such classifications, there is a system in Madhya Pradesh of grading of sal into three grades, according to its fitness for disposal as follows:

- a) Fitness for sale at a rail-head depot,
- b) Fitness for conversion in the semi-permanent sawmills of the forests, and
- c) Fitness for being disposed of in a forest depot only such fitness being decided by a gazetted officer of the forest department.

APPENDIX B

(Clause 6.3)

SAMPLE PRO FORMA FOR GRADING OF TEAK SQUARES

Reference of consignment: Name of the inspecting organization:

Number of teak squares: Represented by:

Sl. No.	IDENTIFI- CATION MARK ON TEAK	DIMENSIONS			GENERAL DEFECTS				DEFECTS FOR WHICH VALUES ARE TO BE CALCULATED				REMARKS ON OTHER DEFECTS, IF ANY	TOTAL UNITS OF DEFECTS	REMARKS
		Length	Breadth	Width	Curva- ture	Taper	Sap- wood	Wane	Knots	Holes	Shakes	Surface Cracks			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)

Grade under which the consignment is placed: Grand total:

Average:

Seal of inspecting authority: Signature of Inspector:

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